Suggestions for Study Program
on "Life on Other Planets"

1. The exploration of possible evidence of life phenomena on other planets of the solar system is probably the most basic scientific problem that planetary exploration can solve. Besides the obvious interest in planetary life (or pre-life) phenomena per se, this exploration may provide clues about the origin of terrestrial life and about pre-life organic chemicals and about early stages of evolution. In the present stages of development of biological science, any such information may provide the key to major advances both in basic and in applied biology.

2. Exploration can be accomplished by various approaches: from earth; from earth satellites; from "near misses" or circumplanetary satellites; by crash landings; by "soft landings". Each approach presents distinct opportunities; landings also present distinct dangers of contamination that would obscure the primitive conditions of the planetary surface.

3. It is urgently important for biologists to evaluate present and forthcoming knowledge of planetary conditions in relation to its possible bearing on life phenomena.

4. Biologists should plan to work with other space scientists in formulating a national program of research on "the detection of life", including organic-chemical, microbiological, and biophysical approaches. Especially it is important to plan how to obtain the maximum information with a minimum of risk of contamination and at the least cost at each stage of exploration. Instruments must be devised to provide this information. When landings are feasible, sampling devices must be ready, and safety measures must be agreed upon to prevent both unnecessary delay and irreparable contamination. It is important that at every stage the chances of contamination be weighed against the amount of useful information that might be obtained.

5. Cooperative studies and research on an international basis should provide a maximum exchange of information and a basis for agreement on precautions and rapid evaluation of findings so as to minimize the hazards.

6. Several steps are therefore recommended:

    a. An immediate study of planetary geography and physics from the viewpoint of biology. Astronomers and biologists should be asked to cooperate in this evaluation of available knowledge.

    b. Machinery for the prompt dissemination of new information on the planets among biologists should be set up.

c. Research on the manifestations of life phenomena that might be detectable at each stage of exploration and on the devices for this should be stimulated through nationally organized committees, conferences, and study groups. Reports of such meetings should be centrally collected, and the results disseminated on an international basis.

d. Criteria for acceptable "calculated risks" should be discussed and, if possible, agreed upon internationally.

e. An initial international meeting of interested biologists and astronomers could be organized, possibly in connection with the Spallanzani Memorial Conference at the University of Pavia, Italy, on May 7 to 9, 1959.